

Application No.: 10/728,135

Docket No.: JCLA12578

In the Claim:

Please amend the claims as follows:

Claim 1. (currently amended) An immersion lithography process, comprising:

forming a photoresist layer on a material layer;

forming a protective layer on the photoresist layer, wherein the protective layer is made of an acid-sensitive and radiation unsensitive material;

performing an immersion exposure step to define an exposed portion and an unexposed portion in the photoresist layer;

performing a ~~solubilization~~ baking step to alter polarity of ~~solubilize~~ the protective layer on the exposed portion of the photoresist layer by acid produced in the exposed portions of the photoresist layer in the immersion exposure step; and

performing a development step to remove the exposed portion of the photoresist layer and the protective layer thereon.

Claim 2. (canceled)

Claim 3. (currently amended) The immersion lithography process of claim 12, wherein the acid produced in the exposed portion of the photoresist layer diffuses to the overlying protective layer to alter the polarity of the protective layer on the exposed portion of the photoresist layer in the baking ~~solubilization~~ step.

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Claim 4. (currently amended) The immersion lithography process of claim 3, wherein the exposed portion of the photoresist layer and the protective layer thereon are turned to be hydrophilic from a hydrophobic state with the immersion exposure step and the baking solubilization step.

Claim 5. (canceled)

Claim 6. (original) The immersion lithography process of claim 1, further comprising forming an anti-reflection coating on the material layer before the photoresist layer is formed.

Claim 7. (currently amended) An immersion lithography process, comprising:

- forming a photoresist layer on a material layer;
- forming an acid supplying layer on the photoresist layer;
- forming a protective layer on the acid supplying layer;
- performing an immersion exposure step to define an exposed portion and an unexposed portion in the photoresist layer, while an acid is produced in the acid supplying layer;
- performing a baking solubilization step to make the acid produced in the acid supplying layer diffuse to the protective layer and the unexposed portion of the photoresist layer; and
- performing a development step to pattern the protective layer, the acid supplying layer and the photoresist layer simultaneously.

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Claim 8. (currently amended) The immersion lithography process of claim 7, wherein the exposed portion of the photoresist layer and the protective layer thereon are turned to be hydrophilic from a hydrophobic state with the immersion exposure step and the baking solubilization step.

Claim 9. (canceled)

Claim 10. (original) The immersion lithography process of claim 7, further comprising forming an anti-reflection coating on the material layer before the photoresist layer is formed.

Claim 11. (currently amended) A mask layer structure applied in an immersion lithography process, comprising:

a photoresist layer on a material layer; and

a protective layer on the photoresist layer for preventing mutual diffusion between the photoresist layer and an immersion liquid used in an immersion exposure step of the immersion lithography process, wherein the protective layer is made of an acid-sensitive and radiation unsensitive material and polarity of the protective layer is capable of being altered by acid.

Claim 12. (original) The mask layer structure of claim 11, further comprising an acid supplying layer between the protective layer and the photoresist layer.

Claim 13. (original) The mask layer structure of claim 11, further comprising an anti-reflection coating (ARC) under the photoresist layer.

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Claim 14. (New) The mask layer structure of claim 11, wherein the acid is produced by the photoresist layer after being exposed.

Claim 15. (New) The mask layer structure of claim 12, wherein the acid is produced by the acid supplying layer.